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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/066,072	02/01/2002	Peter Jivan Shah	010139	2527

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Qualcomm Incorporated
Patents Department
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EXAMINER	
CHOW, CHARLES CHIANG	
ART UNIT	**PAPER NUMBER**
2685	

DATE MAILED: 09/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/066,072	SHAH, PETER JIVAN	
	Examiner	Art Unit	
	Charles Chow	2685	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *14 July 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,8-11,13,14,17-20,22-24,26-28,31,33 and 34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *31,33-34* is/are allowed.

6)☒ Claim(s) *1,3,8-11,13,14,17-20,22-24 and 26-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Detailed Action

(For amendment received on 7/14/2005)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 1, 3, 8-11, 13-14, 17-20, 22-24, 26-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cantwell et al. (US 5,410,750) in view of Tolson (GB 2,343,572 A1).

Regarding **claim 1**, Cantwell et al. (Cantwell) teaches a system for reduction of distortion [Fig. 1-2, abstract] having a combined signal including a desired signal and a jammer signal [signal (S) + noise (n) + interference (I)], comprising

a down mixer configured to frequency convert at least a portion of the combined signal to substantially a base band signal [the down converting at 23, Fig. 2-3, of the combined signal plus nose plus interference, Fig. 2], to base band [col. 3, lines 1-20];

a filter to remove the desired signal and thereby provide a filtered signal representative of the jammer signal [the estimated interference signal at the output of interference detector 18, the LPF 26, 34 for extracting interference for up-converting the interference, Fig. 3, col. 8, line 57 to col. 9, line15; the interference excisor 42 for extracting interference signal from received combined signal, col. 12, lines 27-38],

an up mixer configured to frequency convert the filtered signal to an up converted filtered signal at a substantially a frequency of the jammer signal [the up converter 46, Fig. 2/Fig. 4, to convert the filtered signal, from interference excisor, col. 12, lines 27-38, to output substantially a frequency of the interference signal at the "-" terminal of the canceler 20, in

order to remove the interference signal having the same frequency at the "-" terminal of the canceler 20, Fig. 2];

an adder circuit [20, Fig. 2] to receive the combined signal [combined signal s+n+I at "+" terminal of canceler 20], and the upocnverted filtered signal to thereby removed the jammer signal therefrom [the upconverter 46 output interference estimate at "-" terminal to remove the interference signal, Fig. 2, col. 3, lines 14-19; col.8, lines 23-49], wherein the adder circuit comprises a positive [+" terminal of 20, Fig. 2] and negative input ["-" terminal of 20], the combined signal being coupled to the positive input [delayed S+n+I is coupled to "+" terminal of 20], and the upconverted filtered signal being coupled to the negative input of adder [estimated interference signal is coupled to "-" terminal of 20, filtered by interference excisor 42, col. 12, lines 27-38].

Cantwell fails to teach the wireless communication and the signal mixer coupled to the output of adder circuit. However, Tolson teaches the removing of the unwanted signal can be removed for the mobile phone in wireless communication system [abstract, Fig. 5, page 1 first paragraph; the mixer 6 coupled to the adder 5, Fig. 5]. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to use Cantwell receiver circuitry in Tolson's wireless mobile phone, in order to remove the interference signal in the widely used wireless communication system.

Regarding **claim 3**, Cantwell teaches the first and second signal portions to substantially the frequency of the jammer signal [Iout, Qout, at the input of the upconverter 46 to the frequency of the interference signal at the "+" terminal of the cancel 20, Fig. 2].

Tolson teaches above the GSM communication receiver is a quadrature circuit (I, Q output 8, 9) and quadrature mixer 6. Tolson also teaches the first and second filter 10, 11 (figure in cover page), the first and second quadrature up mixers in 12. Tolson taught the summer

coupled to first and second quadrature up mixer (12) having the combined converted first and second signal portions inside mixer 12.

Regarding **claim 8**, Tolson teaches the base band I, Q at 8-9 (Fig. 5) and the high pass filters (10-11).

Regarding **claim 9**, Tolson teaches the analog filter (the filters 14-15, 10-11, page 6 lines 5-6).

Regarding **claim 10**, Tolson teaches the wireless communication unit has specified operational bandwidth (page 4, fourth paragraph, the GSM 25 MHz), and filter has filter bandwidth based on the operational bandwidth (the selecting pass band for a particular mode of operation, page 6, line 10-12, the multi-mode mobile phone, page 1, lines 1-2).

Regarding **claim 11**, Cantwell teaches a circuit for reduction of distortion [Fig. 1-5, abstract] having a combined signal including a desired signal and a jammer signal [signal (S) + noise (n) + interference (I)], comprising

means for down converting at least a portion of the combinced signal to substantially baseband combined signal [the down converting at 23, Fig. 2-3, of the combined signal plus nose plus interference, Fig. 2], to base band [col. 3, lines 1-20];

means for filtering the base band combined signal to remove the desired signal and thereby provide a filtered signal representative of the jammer signal [the estimated interference signal at the output of interference detector 18, the LPF 26, 34 for extracting interference for up-converting the interference, Fig. 3, col. 8, line 57 to col. 9, line15],

means for up converting the filtered signal to an unconverted filtered signal at substantially a frequency of the jammer signal [the up converter 46, Fig. 2/Fig. 4, to convert the filtered signal, from interference excisor, col. 12, lines 27-38, to output substantially a frequency of the interference signal at the "-" terminal of the canceler 20, in order to remove the

interference signal having the same frequency at the "-" terminal of the canceler 20, Fig. 2]. means for adding the combined signal and the upconverted filtered signal [the adder, canceler 20 adding the combined signal s+n+I at "+" terminal of canceler 20 to the upconverted filter signal from upconverter 46, filtered by excisor 42] thereby to generate a signal with reduced jammer signal [the upconverter 46 output interference estimate at "-" terminal to remove the interference signal, Fig. 2, col. 3, lines 14-19; col.8, lines 23-49], wherein the adder circuit comprises a positive (+" terminal of 20, Fig. 2) and negative input ["-" terminal of 20], the combined signal being coupled to the positive input [delayed S+n+I is coupled to "+" terminal of 20], and the upconverted filtered signal being coupled to the negative input of adder (estimated interference signal is coupled to "-" terminal of 20, filtered by interference excisor 42, col. 12, lines 27-38].

Cantwell fails to teach the wireless communication and the signal mixer coupled to the output of adder circuit. However, Tolson teaches the removing of the unwanted signal can be removed for the mobile phone in wireless communication system [abstract, Fig. 5, page 1 first paragraph; the mixer 6 coupled to the adder 5, Fig. 5]. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to use Cantwell circuitry in Tolson's wireless mobile phone, in order to remove the unwanted signal.

Regarding **claim 13**, Tolson teaches the quadrature communication circuit, the means for down converting comprising mixer core 3/6, wherein the means [10-11] for filtering first and second I, Q signal portions respectively and the means for upconverting [12] the I, Q filtered signal portions to provide substantially the frequency of the jammer, unwanted signal to adder 5], the circuit further comprising means for combining the converted first and second signal portion [the circuit 12 combines the I, Q signal from filter 10-11].

Regarding **claim 14**, Cantwell teaches A circuit for the reduction of distortion in a receiver configured to receive a radio signal frequency RF [Fig. 1-2, abstract, RF signal to block 16 in Fig. 1], the received RF signal being a combined signal containing a desired signal and a jammer signal [signal (S) + noise (n) + interference (I)], a down converter configured to The received RF signal to a selected lower frequency [the down converting at 23, Fig. 2-3, of the combined signal plus nose plus interference, Fig. 2], to base band [col. 3, lines 1-20], the circuit comprising means for filtering the combined signal at the selected low frequency to remove the desiredsignal and thereby provide a filtered signal representative of the jammer signal [the estimated interference signal at the output of interference detector 18, the LPF 26, 34 for extracting interference for up-converting the interference, Fig. 3, col. 8, line 57 to col. 9, line15; the interference excisor 42 for extracting interference signal from received combined signal, col. 12, lines 27-38],

means for converting the filtered signal to a signal [the up converter 46, Fig. 2/Fig. 4, to convert the filtered signal, from interference excisor, col. 12, lines 27-38, to output substantially a frequency of the interference signal at the "-" terminal of the canceler 20, in order to remove the interference signal having the same frequency at the "-" terminal of the canceler 20, Fig. 2];

means for adding the received signal and filtered signal to remove the jammer signal to generate an signal with reduced jammer signal and means, distinct from the downconverter, for frequency converting the filtered signal with reduced jammer signal [an adder circuit 20, Fig. 2, to receive the combined signal s+n+I at "+" terminal of canceler 20; the upconverter 46 output interference estimate at "-" terminal to remove the interference signal at canceler 20, Fig. 2, col. 3, lines 14-19; col.8, lines 23-49]. Cantwell fails to teach the selected RF for up converting. Tolson teaches the upconverting using frequency from oscillator 7 at mixer

12 in Fig. 5, in order to cancel the unwanted signal. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to use Cantwell receiver circuitry in Tolson's upconverting using freqeuncy from oscillator 7, in order to remove the interference Signal.

Regarding **claim 17**, Tolson teaches the base band I, Q [8-9, Fig. 5] and the high pass filters [10-11].

Regarding **claim 18**, Tolson teaches the analog filter [filters 14-15, 10-11, page 6, lines 5-6].

Regarding **claim 19**, Tolson teaches the wireless communication unit has specified operational bandwidth [page 4, fourth paragraph, the GSM 25 MHz], and filter has filter bandwidth based on the operational bandwidth [selecting pass band for particular mode of operation, page 6, lines 10-12, the multi-mode mobile phase, page 1, lines 1-12].

Regarding **claim 20,** Cantwell teaches a method for reduction of distortion in communication circuit [Fig. 1-2, abstract] having a combined signal including a desired signal and a jammer signal [signal (S) + noise (n) + interference (I)], the method comprising

down converting at least a portion of the combined signal to substantially a base band signal [the down converter 23 for down a portion of the combined signal using frequency of 17Fo, col. 5, line 20-21, to base band in col. 3, lines 1-20],

filtering the combined baseband signal to remove the desired signal and thereby provide a filtered signal representative of the jammer signal [a filter LPF 26, excisor 42, for extracting the interference signal from baseband, col. 8, lines 57 to col. 9, line 15; col. 12, lines 27-38],

up converting the filtered signal to an up converted filtered signal at substantially a frequency of jammer signal [the up converter 46, Fig. 2/Fig. 4, to convert the filtered signal, from interference excisor, col. 12, lines 27-38, to output substantially a frequency of the

interference signal at the "-" terminal of the canceler 20, to remove the interference signal having the same frequency at the "-" terminal of the canceler 20, Fig. 2];

adding circuit [20, Fig. 2] for adding the combined signal and the up converted filtered signal to remove the jammer signal therefrom to produce a jammer canceled signal [the upconverter 46 output interference estimate at "-" terminal to remove the interference signal, Fig. 2, col. 3, lines 14-19; col.8, lines 23-49], wherein the adder circuit comprises a positive [+" terminal of 20, Fig. 2] and negative input ["-" terminal of 20], the combined signal being coupled to the positive input [delayed S+n+I is coupled to "+" terminal of 20], and the upconverted filtered signal being coupled to the negative input of adder [estimated interference signal is coupled to "-" terminal of 20, filtered by interference excisor 42, col. 12, lines 27-38].

Cantwell fails to teach the wireless communication and the downconverting the jammer canceled signal to generate a reduced distortion signal. However, Tolson teaches the removing of the unwanted signal can be removed for the mobile phone in wireless communication system [abstract, Fig. 5, page 1 first paragraph; the down converting mixer 6 coupled to the adder 5 for downconverting the jammer canceled signal to generate a reduced distortion signal, Fig. 5]. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to use Cantwell circuitry in Tolson's wireless mobile phone, in order to remove the unwanted signal.

Regarding **claim 22**, Cantwell teaches the method for receiving a rf signal at selected rf, the rf signal containing the desired signal the the jammer siganl [Fig.1 receiving rf signal with combined signal having desired signal, plus noise plus interference, abstract, S+n+I, at selected rf 137Fo].

Regarding **claim 23**, Tolson teaches the wireless communication GSM receiver is a

quadrature circuit for converting rf signal to first and second quadrature components at selected frequency, the I/Q high pass filters 10-11 and the up conversion mixer 12, the combining of the upconverted signals in 12 (Fig. 5). Cantwell teaches the down converting a portion of the combined signal in Fig. 3, with low pass filter 26, 34, to extract a portion of the combined signal having interference only, col. 8, line 57 to col. 9, line15].

Regarding **claim 24**, Tolson teaches the splitting the combined converted signal into two quadrature signal I, Q (8, 9, page 4 third paragraph, page 5 first paragraph), the adder circuit comprising fist and second adder portion for adding first split signal, and the combined signal, and the second split signal and the combined signal (the two inputs to summer 5, page 5 third paragraph).

Regarding **claim 26**, Tolson teaches the base band I, Q at 8-9 (as shown above) and the high pass filters 10-11 (above).

Regarding **claim 27**, Tolson teaches the analog filter (the filters 14-15, 10-11, page 6 lines 5-6).

Regarding **claim 28**, Tolson teaches the wireless communication unit has specified operational bandwidth (page 4, fourth paragraph, GSM 25 MHz), and filter has filter bandwidth based on the operational bandwidth (the selecting pass band for a particular mode of operation, page 6, line 10-12, the multi-mode mobile phone, page 1, lines 1-2).

Allowable Subject Matter

2. The following is an examiner's statement of reasons for allowance:

Regarding claim 31, 33-34, the prior art fails to teach singly, particularly or in combination for **the circuit structure [applicant's Fig. 6]** for a four way splitter having an input and first, second, third and fourth outputs, the four way splitter input coupled t the rf stage output, having an adder comprising first and second adder portions, each adder portions providing

reduced distortion output rf signals, the second input of the first and second adder portion being coupled to the third and fourth four way splitter outputs respectively, a filter, an up-mixer, a summer, as shown in claim 31.

The dependent claims are also allowable due to their dependency upon the independent claims and having additional claimed features.

The closest patent to **Cantwell (US 5,410,750), Tolson (GB 2,343,572),** fails to teach the cancellation of inference at receiving RF signal, and the above circuit structure.

Other prior arts in below has been considered, but they fail to teach the above claimed features.

Takada (US 2002/0155,812 A1), Eaton et al. (US 4,287,475), Horikawa et al. (US 4,320,523), Kurth et al. (US 4,613,978), Tam et al. (US 4,673, 982).

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Argument

3. Applicant's arguments with respect to claims 1, 3, 8-11, 13-14, 17-20, 22-24, 26-28 have been considered but are moot in view of the new ground(s) of rejection.

Applicant's argued that Tolson does not teach the feed forward circuitry in order to combine with Cantwell; Cantwell 's GPS receiver in high interfering environment is unlike applicant's jammer signal, in pages 10-12 of applicant's amendment.

Regarding applicant's argument for Tolson does not teach the feed forward circuitry in order to combine with Cantwell, Applicant's independent claims 1, 11, 14, 20 do not contain the the word, feed forward, as the limitation, and applicant's Fig. 3 is also a feed forward

structure.

Regarding Cantwell's GPS receiver in high interfering environment is unlike applicant's jammer signal, the GPS receiver is used in wireless communication for providing accurate location information. Cantwell's GPS interference suppressor receiver 10 [Fi.g1] closed related to the wireless communication receiver. Further, the Jammer signal and interference signal are both creating the same effect to interfere the receiving condition, by overriding, prevailing over the desired signal, with the undesired, unwanted signal, therefore, Cantwell's interference environment is equivalent to applicant's jammer signal enviroment.

Regarding the newly amended portions in the claims, Cantwell teaches a down mixer configured to frequency convert at least a portion of the combined signal to substantially a base band signal [the down converging at 23, Fig. 2-3, of the combined signal plus nose plus interference, Fig. 2], to base band [col. 3, lines 1-20]; an up mixer configured to frequency convert the filtered signal to an up converted filtered signal at a substantially a frequency of the jammer signal [the up converter 46, Fig. 2/Fig. 4, to convert the filtered signal, from interference excisor, col. 12, lines 27-38, to output substantially a frequency of the interference signal at the "+" terminal of the canceler 20, in order to remove the interference signal having the same frequency from the output of the converter 46, at the "-" terminal of the canceler 20, Fig. 2]. Tolson teaches a signal mixer coupled to the adder circuit [mixer 6, Fig. 5].

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of

the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles C. Chow whose telephone number is (571) 272-7889. The examiner can normally be reached on 8:00am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Urban can be reached on (571) 272-7899. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Charles Chow C.C.

August 27, 2005.

Nguyen Vo 9-2-2005

NGUYEN T. VO
PRIMARY EXAMINER